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## THE SPECIFIC DIFFERENCES BETWEEN THE CHUB MACKERELS OF THE ATLANTIC AND PACIFIC OCEANS.

In the Proceedings of the United States National Museum, Vol. 38, p. 237, Evermann and Kendall published "a comparison of the Chub Mackerels of the Atlantic and Pacific Oceans." In this paper the forms on the two sides of the continent were found to belong to different species. About the same time the present writer had occasion to examine the specimens of Chub Mackerel in Stanford University. In these specimens the differences used by Evermann and Kendall in separating the species showed only very slightly, or in some cases not at all.

Hence it seemed desirable to obtain a considerable number of freshly preserved specimens from the Atlantic and Pacific coasts for further comparisons. The United States Bureau of Fisheries kindly furnished me two dozen specimens, 13 or 14 inches in length, from Woods Hole; the California Fish and Game Commission a dozen specimens of similar size from San Pedro, California; and I collected several specimens at Monterey Bay.\* In addition to these the United States National Museum loaned me a number of specimens from various parts of the Atlantic. These, being very variable in size and

\* On the southern California coast (San Diego and San Pedro) I have seen mackerel brought to market in considerable numbers that measured 23 and 24 inches in length. At Monterey Bay I have never seen any that were nearly that large. Probably were careful measurements made of a large number of mackerel at different localities along the coast, "tribal" differences would be found.

condition of preservation, have not been used where measurements were involved, but were valuable in comparisons of scales, color markings and similar characters. The same may also be said of such specimens that are in the collections of Stanford University. In the following measurements only specimens of approximately similar size from Woods Hole, San Pedro, and Monterey Bay were used. These were all freshly preserved by the same method, and were in similar condition.

Upon comparing these the most striking difference appears in color pattern. The Atlantic specimens are thickly covered with dusky spots all over the lower part of the sides. When spots are present in Pacific specimens they are much less distinct, much smaller and take the form of reticulated lines. Often the lower part of the sides are silvery, with no trace of spots.

Probably the most important difference lies in the size of the scales. In the Pacific specimens the scales are much finer and more numerous. In the space between the spinous dorsal and the occiput there are from 50 to 55 series of scales, while in a series running obliquely downward and backward from the front of the soft dorsal to the lateral line there are from 21 to 24. In the Atlantic specimens there are in the dorsal-occipital region from 37 to 40 scales, and from the soft dorsal to the lateral line 16 to 18.

A slight difference appears in the number of gill-rakers below the angle of the arch. In the Atlantic specimens they run from 23 to 26, and in the Pacific ones from 26 to 28.

The following measurements are expressed in hundredths of length to the caudal base, and were made from specimens from 28 to 34 centimeters in length to the same point.

A rather constant difference appears in the length of the maxillary. This was measured with the mouth closed, and it was necessary in making it to

separate the posterior end of the preorbital from the side of the head. From the tip of the snout to the end of the maxillary the Atlantic specimens measure 10 hundredths, while the Pacific ones measure 11 hundredths.

There is a difference in the size of the head, as was found by Evermann and Kendall. In the Atlantic specimens this runs from 26 to  $26\frac{1}{2}$  hundredths, in those from the Pacific from 27 to 28 hundredths.

A scarcely appreciable difference appears in the length of the snout, running from 8 to  $8\frac{1}{2}$  hundredths in Atlantic specimens, and from  $8\frac{1}{2}$  to 9 in Pacific ones.

Of the large number of other measurements taken no differences appeared. Among these were length of gill-rakers, diameter of eye, length of fin bases, distances between fins, and length of fin rays and spines.

As published in Science, September 9, 1921, I have raised the subgenus *Pneumatophorus* Jordan and Gilbert to generic rank, thus separating those forms of the former genus *Scomber* that have a swim bladder from those that have not. The Atlantic Chub Mackerel is thus *Pneumatophorus colias* (Gmelin), and the Pacific one *Pneumatophorus japonicus* (Huttyu). Should the form from the Japanese Sea, *Pneumatophorus japonicus*, prove to be distinct from that from the western American coast the latter would be *Pneumatophorus diego* (Ayres).

EDWIN C. STARKS,  
Stanford University, Calif.

#### **LAMPETRA WILDERI JORDAN AND EVERMANN IN THE DISTRICT OF COLUMBIA.**

Three specimens of *Lampetra wilderi* Jordan and Evermann were taken in Oxon Run, a small tribu-